REMARKS

A. Background

Initially, On September 11, 2007, Applicant filed a response to the final Office Action that was issued on June 28, 2007. On October 1, 2007, an Advisory Action was issued stating that the arguments submitted in the September 11th response were not persuasive and thus did not place the application in condition for allowance.

Claims 1-10, 12, 14-16, and 50-54 were pending in the application at the time of the Office Action. Claims 1-10, 12, 14-16, and 50-54 were rejected as being obvious over cited art. Claims 11, 13, and 17-49 were cancelled in earlier papers. By this response Applicant has amended claims 2, 5, 9, and 10 to further clarify the claimed invention. Support for the amendments can be found at least at page 28, lines 1-5 of the specification. As such, claims 1-10, 12, 14-16, and 50-54 are presented for the Examiner's consideration in light of the following remarks.

B. Rejection of the Claims

Pages 2-10 of the Office Action reject claims 1-7, 9, 10, 14-16, and 50-54 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,501,776 to Numai ("*Numai*") in view of U.S. Patent No. 6,580,740 to Funabashi et al. ("*Funabashi*") and further in view of U.S. Patent No. 5,155,737 to Ikeda et al. ("*Ikeda*"). Of the rejected claims, claims 1-3, 5, and 6 are independent claims. Applicant respectfully traverses this rejection.

The Examiner states in the Advisory Action that *Numai* and *Funabashi* teach the structural limitations of the claimed device and *Ikeda* teaches a device with a grating having a coupling coefficient of at least 300 cm^{-1} in order to achieve wide band characteristics.

However, none of the cited references, alone or in combination, discloses, teaches or suggests widening a temperature compensation range in a semiconductor laser whose temperature dependence is adjusted by the propagating region. Further, none of the references, alone or in combination, discloses, teaches or suggests the use of a grating having a high coupling coefficient in the semiconductor laser whose temperature dependence is adjusted by the propagating region in order to achieve wide temperature compensation range. Also, as noted in the September 11th response, *Ikeda* does not disclose, teach or suggest the use of a grating having a high coupling coefficient in the gain region.

In general, a grating having a high coupling coefficient is not used for a semiconductor laser, since it has poor wavelength stability. Therefore, a person skilled in the art would not, without a compelling reason, try to use a grating having a high coupling coefficient. Although *Ikeda* appears to include a grating having a high coupling coefficient, as cited by the Examiner, please note this grating is used in addition to a grating having a low coupling coefficient which in fact determines the wavelength selectivity and thus ensures the wavelength stability.

In the present invention, a grating having a high coupling coefficient greater than 300 cm^{-1} is used in the gain region, but not in the propagating region nor the reflection region. Because of this structure, a wider temperature compensation range is achieved, while avoiding problems related to the grating having a high coupling coefficient. For example, if such grating were not disposed in the gain region, the grating might be required in the reflection region. Due to the poor wavelength stability of the grating, however, a shorter cavity would likely be required to achieve the required wavelength selectivity, which would result in a shorter gain region, thus limiting the gain obtained in the gain region. By having the grating in the gain region, this

problem can be circumvented so that the cavity can be made shorter without sacrificing the gain obtained in the gain region.

Furthermore, by having the grating in the gain region, higher design flexibility is achieved. For example, by having the grating in the gain region, a contribution of the propagating region in the laser can independently be determined. The stop bandwidth, which determines a temperature compensation range, is determined by the coupling coefficient of the grating, whereas the phase in the cavity which determines the oscillation wavelength is determined by the sum of the length of the propagating region and the effective length of the grating. Accordingly, the phase characteristic can be determined by the length of the propagating region, while the stop bandwidth can be independently determined by the grating in the gain region. This would not be possible if the grating was formed in the propagating region.

As noted above, claims 2, 5, 9, and 10 have been amended to recite that the propagating region has a material "other than a semiconductor" that i) has an effective refractive index whose temperature dependence differs from that of the gain region (claims 2 and 5) or ii) that has a temperature differential coefficient of the effective refractive index that is different from that of a semiconductor (claim 9) or iii) that has a temperature differential coefficient of the effective refractive index that is negative (claim 10). Applicant submits that none of the cited references, alone or in combination, teach or suggest this added limitation of claims 2, 5, 9, and 10.

In view of the foregoing, Applicant submits that it would not be obvious to arrive at the presently claimed inventions by combining the cited references as asserted in the Office Action and Advisory Action. Accordingly, Applicant respectfully requests that the obviousness rejection of claims 1-7, 9, 10, 14-16, and 50-54 and 6 be withdrawn.

Pages 10-12 of the Office Action reject claims 8 and 12 as being unpatentable over the *Numai/Funabashi/Ikeda* combination, discussed above, further in view of U.S. Patent No. 4,583,227 to Kirkby ("*Kirkby*") (claim 8) or U.S. Patent No. 5,719,974 to Kashyap ("*Kashyap*") (claim 12). *Kirkby* is merely cited for allegedly teaching "an absolute value of a product of a length of said propagating region and a difference between a temperature differential coefficient of the effective refractive index of said gain region and a temperature differential coefficient of the effective refractive index of said propagating region is equal to or greater than 7.5×10^{-4} μm/K." *Kashyap* is merely cited for allegedly teaching "the length of said propagating region is determined such that a longitudinal mode spacing determined by a sum of an effective length of the diffraction grating of said gain region and a length of said propagating region, is greater than a stop bandwidth of said diffraction grating." Applicant respectfully traverses these rejections.

Claims 8 and 12 depend from claim 1 and thus incorporate the limitations thereof. As such, Applicant submits that claims 8 and 12 are distinguished over the cited art for at least the same reasons as discussed above with regard to claim 1. Accordingly, Applicant respectfully requests that the obviousness rejection with regard to claim 8 and 12 be withdrawn.

Furthermore, Applicant submits that the Examiner's use of *Kashyap* in the rejection of claim 12 is in error. The cited portions of Kashyap (col. 8, line 24 and col. 9, lines 2-5) refer to a 'drop-out' in a Mach-Zehnder interferometer and appear to have nothing to do with stop bandwidths in semiconductor lasers.

No other objections or rejections were set forth in the Office Action.

C. Conclusion

Applicant notes that this response does not discuss every reason why the claims of the present application are distinguished over the cited art. Most notably, applicant submits that many if not all of the dependent claims are independently distinguishable over the cited art. Applicant has merely submitted those arguments which it considers sufficient to clearly distinguish the claims over the cited art.

In view of the foregoing, applicant respectfully requests the Examiner's reconsideration and allowance of claims 1-10, 12, 14-16 and 50-54 as amended and presented herein.

In the event there remains any impediment to allowance of the claims which could be clarified in a telephonic interview, the Examiner is respectfully requested to initiate such an interview with the undersigned.

Dated this 29th day of October 2007.

Respectfully submitted,

/Scott A. Woodbury/ Reg. #55743
SCOTT A. WOODBURY
Registration 55,743

DANA L. TANGREN
Registration No. 37,246

Attorneys for Applicant
Customer No. 022913
Telephone No. 801.533.9800

SAW:cad
SW0000000370V001